# 325-MS

## TRIPLE QUADRUPOLE MASS SPECTROMETER

NOTICE: This document contains references to Varian. Please note that Varian, Inc. is now part of Agilent Technologies. For more information, go to **www.agilent.com/chem.**

Agilent Technologies

The Varian 325-MS is a rugged, reliable option for many applications. It features a "vortex" electrospray interface (vESI™) and Gold Guard™ ion optics that jointly enhance sensitivity, ruggedness and throughput.

The higher sensitivity means you can analyze more compounds in a single run. The more rugged design means less downtime spent cleaning the source. It all adds up to an extremely productive solution.

### Triple-Stage Quadrupole

- Dual-quadrupole mass filters, with pre- and post-filters (ion guides)
- 180°, lensless collision-cell system with square geometry improves ion transmission and reduces noding for increased sensitivity
- Mass range: 10–2000 *m/z*
- Mass resolution: unit mass (0.7 amu, fwhm) over the entire mass range
- Mass axis stability: ±0.1 amu over 24 hours
- Scan rates: up to 6000 amu/sec
- Adjustable dwell times: 2-14,000 ms (software defined per transition)
- Software control and automated optimization of collision energy and gas pressure
- Automated algorithms for system calibration, tuning, and compound optimization
- Collision gas: greater than 99% argon at 20 psi

### API Interfaces

- Spray chamber temperature: up to 65° C
- Quadrupole ion guide: off-axis (6°) with respect to capillary guide
- Capillary voltage: up to 300 V (compound dependent)
- Nebulizing/drying/vortex gases: require 99% $N_2$ at 80 psi with < 0.1 ppm of hydrocarbons and < 1% of $O_2$; also requires clean, dry air at 80 psi with < 0.1 ppm of hydrocarbon for negative ionization mode

- Vortex Electrospray (vESI)
  - LC flows: 50 to 2000 µL/min
  - vESI voltage: 500 V to 6 kV
  - Spray shield: up to 800 V
  - vESI probe position: y-z positioning and independent adjustment of the vESI needle
  - Maximum drying and vortex gas consumption: 10 L/min each
  - Maximum drying and vortex gas temperatures: 400° C each

- Atmospheric Chemical Ionization (APCI)
  - LC flows: 100 to 2000 µL/min
  - APCI current: up to 15 µA
  - Spray shield: up to 800 V
  - APCI probe position: y positioning and independent adjustment of the corona discharge needle
  - Maximum drying and auxiliary gas consumption: 10 L/min and 5 L/min
  - Maximum drying and auxiliary gas temperatures: 400° C and 550° C

### Vacuum System

- Superior two-stage turbomolecular pump for API and analyzer regions, 310/400 L/sec, air-cooled; MacroTorr™ stages at exit for higher foreline pressures
- Foreline pumps: (2) Varian MS40+ pumps with integrated oil mist eliminator and oil return kit; 3-phase motor with low startup current (<10 A) does not require a special breaker or 3-phase AC mains supply

## Detection System

- Highly efficient ion detector: positive or negative ions, constant 5 kV post-acceleration voltage, with positive-to-negative switching
- Linear dynamic range: up to $10^6$, compound-dependent based on analytical method

## Scan Functions

- Selected Ion Monitoring (SIM) in Q1 or Q3
- Full Scan in Q1 or Q3
- Precursor Ion Scanning
- Product Ion Scanning
- Neutral-Loss Scanning
- Selected-Reaction Monitoring (SRM) and Multiple-Reaction Monitoring (MRM)

## Integrated Divert Valve

- Full control through the system software enables timed switching of the mobile-phase eluent at any point in the analysis

## Integrated Syringe Pump

- Data system control for infusion and loop injections
- Accommodates syringe volumes from 10 µL to 10 mL
- Flow rate range: 0.01 µL/min to 1.0 mL/min

## Advanced Features

- SelecTemp™ provides independent temperature programming of the drying and vortex gases throughout an analysis
- SelecFlow™ provides independent pressure programming of the drying and vortex gases throughout an analysis

## Data System

- MS Workstation processing and instrument control software
- Comprehensive suite of instrument diagnostics
- Data system control of all instrument parameters and peripheral equipment
- MS Workstation software collects data and appends method information and system logs to a data file

## Utilities and Environment

- Vacuum manifold temperature: independent control; 30 °C to 50 °C
- Mass spectrometer: 100-240 Vac, 50/60 Hz ±3 Hz, 1.0 kW
- MS40+ foreline pumps: 200-240 Vac, 50/60 Hz, 1.2 kW (each)
- Humidity: 20% to 80% relative humidity (without condensation)
- Ambient temperature operating range: 16 °C to 30 °C

## Dimensions

- 325-MS: 50 cm (w) x 38 cm (h) x 71 cm (d) / 19.7 in. x 11.8 in. x 28 in.; 108 kg / 238 lb
- 212-LC: 26 cm (w) x 33 cm (h) x 36 cm (d) / 10.2 in. x 13 in. x 14.2 in.; 15 kg / 33 lb
- 460-LC autosampler: 30 cm (w) x 51 cm (h) x 36 cm (d) / 11.8 in. x 20.1 in. x 14.2 in.; 19 kg / 42 lb with cooling option; 30 cm (w) x 57 cm (h) x 36 cm (d) / 11.8 in. x 22.4 in. x 14.2 in.; 21 kg / 46.3 lb without cooling option
- MS40+ pumps: 30 cm (w) x 23 cm (h) x 42 cm (d) / 11.8 in. x 9 in. x 16.5 in.; 33 kg / 73 lb
- Computer: 48 cm (w) x 18 cm (h) x 43 cm (d) / 19 in. x 7.1 in. x 17 in.
- Monitor: 37 cm (w) x 44 cm (h) x 19 cm (d) / 14.6 in. x 17.3 in. x 7.5 in.
- Laser printer: 20 cm (w) x 41 cm (h) x 46 cm (d) / 7.9 in. x 16.1 in. x 18.1 in.

## Sensitivity

- vESI™ source: a 5 µL flow-injection of a 100 fg/µL reserpine solution at flow rate of 200 µL/min 90:10 acetonitrile/$H_2O$ will produce a minimum signal-to-noise ratio (RMS) of 800:1 for the transition of the protonated molecule at *m/z* 609.3 to the fragment ion at 195.1 when operated in SRM mode, with Q1 and Q3 resolution set to 0.7 Da fwhm.
- APCI: a 5 µL flow-injection of a 2 pg/µL reserpine solution at flow rate of 200 µL/min 90:10 acetonitrile/$H_2O$ will produce a minimum signal-to-noise ratio (RMS) of 150:1 for the transition of the protonated molecule at *m/z* 609.3 to the fragment ion at 195.1 when operated in SRM mode, with Q1 and Q3 resolution set to 0.7 Da fwhm.

Varian, Inc.
www.varianinc.com
**North America:** 800.926.3000, 925.939.2400
**Europe** The Netherlands: 31.118.67.1000
**Asia Pacific** Australia: 613.9560.7133
**Latin America** Brazil: 55.11.3238.0400

Other sales offices and dealers throughout the world–check our Web site.



Varian, Inc. reserves the right to revise these specifications without notification. vESI, Gold Guard, MacroTorr, SelecTemp, SelecFlow, Varian and the Varian logo are registered or unregistered trademarks in the U.S. and other countries. © 2009 Varian, Inc.

SI-2230 11/09 Printed in U.S.A.